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Selected recent research studies are reviewed under the following headings: (1) perception pretraining for reading, (2) hierarchical arrangement of reading skills, (3) comparisons of suggested sequences of different basal series, (4) code versus meaning emphasis in beginning reading, and (5) the relative effectiveness of methods involving sequential development. Although many experts believe that there is sequence in learning the reading skills, most of the studies cited in this review were not designed to investigate this specific problem. No final conclusions or evaluations are made. Fifty-four references are included. (RJ)

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SEQUENCE OF READING SKILLS IN READING: IS THERE REALLY ONE?

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IMPORTANCE OF TOPIC

How important is sequence of reading skills in reading? Is there really a sequence - or should there be? Will one sequence work as well as another These are a few of the questions that professional educators are beginning to ask. For years most writers and speakers about the teaching of reading have given the impression that sequence in reading skill instruction is an absolute necessity. They have proceeded, further, to present the skill sequence for reading instruction.

Sequential skills programs of many kinds are available today. These programs certainly are not the same, and still, one of their major ingredients is a sequential arrangement for skill instruction. Easy skills usually are introduced before the more difficult skills, and vocabularies often are controlled. Some of these programs emphasize meaning from the beginning whereas others advocate beginning with the code. Some favor rigid vocabulary control whereas others have very little control. Some start with consonant sounds first, some with vowel sounds first. All of these programs advocate some kind of sequence - but not the same one.

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To look at research and opinion on the topic is long overdue. This session is not likely to answer very many questions about sequence, but it will have served its purpose if it encourages a few persons to probe for some of the answers to questions about sequence.

ORGANIZATION OF PAPER

This paper will be devoted to a review of selected parts of the literature on sequence in reading skill instruction. First, samples of opinions will be presented. Then attention will be turned to recent related research studies.

Research germane to the topic of sequence includes studies dealing with the following:

1. Perception pretraining for reading.
2. Hierarchical arrangement of reading skills.
3. Comparisons of suggested sequences of different basal series.
4. Code versus meaning emphasis in beginning reading.
5. Relative effectiveness of methods involving sequential development.

Selected studies in these five areas will be reviewed. At times, critical evaluations will be made of the investigations cited. The task of this paper is to review the literature as objectively as possible, with no final conclusions or evaluations. The two presentations following will debate the issues.

Several other related areas of research, such as learning modality and programmed learning, were omitted in this review because of space limitation.

In reviewing the literature, only the more recent references are cited. Among the investigations reviewed are a number of the studies included in the twenty-seven that made up the Cooperative Research Program in Primary Reading Instruction. These studies, like most methods studies, suffer from some of the shortcomings of classroom investigations. They still offer information of value to the topic under discussion.

OPINIONS ABOUT SEQUENCE

Almost everyone has an opinion about sequence - and insists on expressing it. The lack of definitve research has not deterred professional educators and the lay public alike from making positive statements and recommendations.

When one picks up professional books and articles on the teaching of reading, the conclusion can be drawn easily that sequence in skill instruction is a "must." On rare occasion does the reader find a statement questioning the idea that sequence is necessary.

"Sequential Aspects of Reading Development" is the title of a chapter in a book by Strang, McCullough, and Traxler (47). The chapter title itself implies that the authors believe that there is a sequence in learning the skills of reading. One of these same authors, Strang (46), in her book on Diagnostic Teaching of Reading, emphasizes the importance of locating the child's present developmental stage in appraising his reading achievement. She adds: "Instruction starts from there and is guided by the teacher's knowledge of a psychological sequence of reading skills."

The 1960 reading conference at the University of Chicago had "Sequential Development of Reading Abilities" as its major theme (32). The approximately

fifty speakers all spoke on this topic, at least giving the impression that reading abilities develop sequentially. Tyler (49), in speaking about the importance of sequence, listed three contributions of sequence to effective learning. One of these incorporated the developmental aspect of learning - that a new learning task builds on and grows out of an earlier learning situation.

According to Russell (35), "most children go through the same patterns of development with an orderly emergence of reading abilities." He also states that persons who prepare basal readers "have general sequential patterns to follow in the content of the materials and in the teaching and learning methods advocated."

Others who have indicated that sequence is important include Smith (41), Gray (13), Witty, Freeland, and Grotberg (53), and, from the field of psychology, Bruner (6). These are just a few of the supporters of sequential instruction of skills.

A few writers question the importance of sequence. Veatch (50), perhaps the strongest advocate of individualized reading, states that ordering skills in sequences as in basal reader guidebooks is unnecessary and misleading. She contends that each child has his own sequence for learning and that is the "sequence" that should be followed. The language-experience approach advocates would also put less emphasis on sequence. Lee and Allen (23), in contrasting the language-experience approach with other patterns, characterize the language-experience approach as being an open type of instruction in which all the language arts are combined. They refer to sequence, but in very broad terms.

Miel (26), in a thought-provoking article, questioned the blind belief in a sequence. She concluded by stressing that sequence in learning is a reality and that it must be adapted to the individual child when it is appropriate for him.

The new yearbook of the National Society for the Study of Education, Innovation and Change in Reading Instruction (31), raises the question of sequence in at least four chapters. As an example, Wittick stated:

> Of special interest is the fact that little research has been done to determine the most effective learning sequences, regardless of the method used. Sequences have been produced logically rather than psychologically... Certain methods may be found more effective than others chiefly because the sequence is better programmed or better suited to the way children learn.

A review of opinions on sequence would be negligent to omit Chall (7). She, of course, advocates sequence - and a special one.

An analysis of the statements attributed to the various authors would reveal, for the most part, that they all lean toward the belief that there is sequence in learning the reading skills - but they certainly would not all agree on what that sequence is. A few lean toward multiple sequences, and at least two play down the importance of sequence in learning reading skills.

PERCEPTION PRETRAINING STUDIES

One type of research related to this topic is the effect of perceptual pretraining upon learning to read. At last year's IRA conference, Stemmler(45) presented a review of perception studies in the area of readiness for reading. Very few studies of this type will be reviewed here.

Three studies of visual discrimination by Muehl relate to the question of sequence in reading skill instruction. His first investigation (28), involving 37 kindergarten children, concluded that learning a list of words was aided by visual discrimination pretraining in which the same words were used. Pretraining with different words or with geometric forms was less effective.

Muehl's second study (29), this time with 60 children, found that the subjects used specific letter differences rather than shape differences to discriminate among words of similar length but different shape. He also noted that children given pretraining with letters only, learned more rapidly in pretraining than those given training with nonsense words of relevant and irrelevant shapes in which the same letters were used. He reported that all three groups performed the same in later task learning. He suggested that his study tends to support providing visual discrimination training with letters later to be met in words. This approach would make the learning task easier, since recognizing letters in words is more difficult than recognizing individual letters.

Muehl's third study (27) investigated the facilitating effect of knowledge of letter names in learning to read words on a list. This study involved 87 subjects. One group learned the names of three letters that were later used as the critical stimuli in learning nonsense words paired with pictures of familiar things. Another group learned names for letters that were not used in the nonsense words later taught. The researcher found that the second group, the one taught the irrelevant letters, learned more rapidly than the "relevant letter" group.

Muehl's studies were limited to 184 Iowa kindergarten children. He gave very little information in his three studies about the backgrounds of the children. Are they typical of children in other parts of the country, or even in other sections of Iowa? This cannot be answered from the data given.

Muehl's first study was supported by the results of an investigation of Staats, Staats, and Schutz (42). This time 36 Arizona children from two kindergartens were the subjects. As in Muehl's study, the researcher found that visual discrimination pretraining with words later to be taught has a facilitating effect.

Another study of perceptual pretraining is that of Gorelick (12). Her 69 subjects, beginning first graders in Los Angeles, were subdivided into three equated groups. By means of an auto-instructional device, one group received visual discrimination training involving abstract symbols while a second group received visual discrimination training involving meaningful symbols. The third group, the control, was given no pretraining. All three groups were later given the same word recognition program. The group with no training achieved as well as the other two groups. This finding may have been related to the kind of symbols used. Abstract symbols were drawings shaped like the words whereas meaningful symbols were pictures illustrating the word.

Other studies of this type are available. They investigate very narrow aspects of the problem and throw very little light on the subject. Some of the studies involve very few subjects, and sometimes even these are not described.

What can be concluded from these studies? Visual discrimination of words seems to have a facilitating effect on learning to read these same words. The

conclusion that much more research is needed can also be drawn.

A review of research on visual discrimination and reading has been presented by Barrett (1), and a review on auditory discrimination and reading by Dykstra (8). They give very little help on the question of sequence.

HIERARCHICAL ARRANGEMENT OF READING SKILLS

Another type of study that touches on this question is the investigation of the extent to which skills arranged logically from simple to complex agree with children's learning of these skills. Someone, on the basis of logic, arranges a group of related skills from simple to complex. Children are then tested on these skills. If the children show that they know more about the skills on the "easy" end of the hierarchy and less about those on the "hard" end, then one can conclude that the logical arrangement is compatible with children's actual learning of these skills. What these studies would not tell, however, is whether some other arrangement might not work as well.

Blake, Aaron, and Westbrook (2), as a part of a larger study, arranged selected subskills in sequence on the basis of expected level of complexity and then tested how well this logically arranged sequence agreed with how difficult the skills actually were for children. Subjects for this study were 639 children who were reading at the beginning of the year at grade two through grade five level, as determined by an informal reading inventory.

The logically arranged sequences, were found to fit fairly closely the results found in testing. The expected order in structural analysis skills, for example, was the following: identifying components of compounds,

identifying roots, endings, and suffixes; identifying roots and prefixes; identifying roots and multiple affixes; locating roots by using root-change rules; and changing roots by using root-change rules. The results of this study merely indicate that these subskills, as arranged on the basis of logic, fit what actually was found. They do not, however, furnish evidence that this is the only arrangement that could have been used.

SEQUENCES OF DIFFERENT BASAL SERIES

All basal series of readers suggest skill sequences for teachers to follow in the teaching of skills. Many of them may be similar in part; no two, however, are the same. Some series of readers start with the building of a small stock of sight words before much is done about teaching word attack whereas others begin with the "code." Most basal reader series teach sound-letter association by beginning with common consonants. Others, however, begin with vowel sounds. Some series emphasize an analytic approach to word attack in which the whole word comes first and then the parts are analyzed to the extent that analysis is necessary for recognition or identification. Other series use a synthetic approach. They start with the parts and then put the pieces together to form the whole.

Certain of the basal skills are sequenced alike from series to series because of the close relationship of the skills cluster. In other words, the growth or learning of these skills is developmental. An example is the learning of the final e phonics generalization. The teaching of this principle, whether it is taught inductively or deductively, would involve knowledge of sounds. Knowing these facts about sound - symbol relationship is a prerequisite for learning the generalization. But do these need to be taught

always in a given order? For example, must the long vowel sound be learned before "silentness" of letters? Or does either pattern work equally as well? Insofar as can be ascertained, no specific studies have focused on this particular sequence problem.

These examples are just a few of the many differences from series to series. Even the series thought to be very similar differ considerably in skill placement. Some series are quite different. Yet, children using all of these varied approaches learn to read, and occasionally some fail. Do they learn equally well? Current research data will not answer this.

CODE VERSUS MEANING STUDIES

Under the label of "code versus meaning," several different kinds of studies may be grouped. These include comparisons of intensive versus gradual phonics, linguistic versus regular basal programs, and synthetic versus analytic approaches. Some studies, of course, cut across approaches. In terms of skills sequence in reading, this review will focus on selected studies in terms of whether or not there is an indication for an early emphasis upon the code.

Instead of attempting to present a compilation of research studies in each of these sub-areas, very brief descriptions ofand conclusions from two reviews will be cited. Then pertinent First Grade Studies and one additional study will be cited.

Intensive Phonics versus Gradual Phonics

Gurren and Hughes (14) reviewed 22 studies dealing with comparisons of intensive and gradual phonics groups. Studies were divided into those meeting selected statistical criteria and those with little control, according to the

judgment of the authors of the review. They reported that 19 studies found significant differences favoring intensive phonics, three found neither approach favored, and no study favored gradual phonics. Gurren and Hughes appear to have classifed as rigorous studies those that support their own viewpoint. Despite this criticism, one may conclude that the majority of the evidence from the cited studies favors intensive phonics.

The review by Chall (7) includes a summary of experiments bearing on "look-say versus phonics," systematic versus intrinsic phonics, linguistic approaches, and modified alphabet approaches. Among many other conclusions, Chall states: "A code emphasis tends to produce better overall reading achievement by the beginning of fourth grade than a meaning emphasis." Chall opened her discussion of research by stating that the reviewer can make research prove almost anything he wants it to prove. She also stated that reading research is inconclusive, and then she proceeds to draw conclusions.

Twelve of the First Grade Studies investigated relative effectiveness of supplementary phonics, initial teaching alphabet, or linguistic approaches. In most instances, these studies compared a regular basal approach with one or more other approaches. The basals used, however, varied considerably from study to study.

Studies by Bordeaux and Shope (5), Harris and Serwer (17), Murphy (30), Tanyzer and Alpert (48), and Wyatt (54) and intensive phonics as one aspect. The Harris and Serwer (18) and Tanyzer studies were continued beyond the first year. The findings of basal versus basal with supplementary phonics, according to Bond and Dykstra (4), showed the basal with supplementary phonics to be significantly better than the basal alone. These findings were based

on analyses of the data from all related studies.

Another related investigation is that of Bliesmer and Yarborough (3). This highly publicized study compared ten different beginning first-grade reading programs. Methods were categorized into analytic and synthetic approaches, with five methods falling into each classification. As the researchers point out, these categories are open to criticism since no method is completely synthetic or analytic. When these two groups were compared on subtests of the Stanford Achievement Test, approximately three-fourths of the cases (92 of 125) revealed significantly higher means for the synthetic methods. The usual criticisms of methods studies apply to the Bliesmer and Yarborough investigation.

Initial Teaching Alphabet versus Basals

Five of the First Grade Studies compare Initial Teaching Alphabet with basal approaches. These were studies by Fry (10), Hahn (15), Hayes (19), Mazurkiewicz (24), and Tanyzer and Alpert (48). All studies also followed the subjects through a second year (11, 16, 20, 25). The Initial Teaching Alphabet materials varied in that one study used Downing materials whereas the other studies used those of Mazurkiewicz and Tanyzer. Basal readers used were not the same throughout these studies.

When all studies comparing the Initial Teaching Alphabet groups with basals are combined, the ITA groups, at the end of grade one, in general, were better on word attack, whereas the basal groups were better on paragraph meaning (4). At the end of grade two, the ITA subjects were superior on word attack and on spelling. The two groups were equal in other respects (9).

Linguistic versus Basals

Four of the First Grade Studies were concerned with the comparison of some type of linguistic program with basal programs. These were studies by Hayes (19,20), Ruddell (33,34), Schneyer (37,38), and Sheldon (39,40). Bond and Dykstra (4) reported that on the linguistic versus basal comparisons at the end of grade one the linguistic groups had a tendency to outperform the basal groups on word recognition, but the basal groups showed greater speed and accuracy in reading. Where the phonic-linquistic approach was used, it was superior on most subtests. At the end of grade two, the main change was that the basal subjects were better on word study skills.

In Summary on Code Versus Meaning Studies

The findings of the majority of the recent studies lean toward an early emphasis upon letter-sound association as the better producer of reading achievement tests results, especially on word recognition. The research studies certainly are not flawless. For example, the First Grade Studies had little control of materials within the various categories. Teacher differences were not controlled, and new approaches were likely to generate more interest and effort than the familiar approaches. Efforts, however, were made in many of the studies to limit the Hawthorne effect.

Two questions need to be raised. If intensive phonics actually is more effective - and a definite conclusion cannot be drawn from the present data though the evidence points in that direction - is sequence in the narrow sense of which letter or skill comes first a major factor? Which is the more important - early emphasis upon the code, or organization and systematic instruction?

INDIVIDUALIZED VERSUS BASAL APPROACH

Another area of reading research that may help to answer the question about the necessity of sequence in reading instruction is that area dealing with basal reading series versus individualized reading. If basal series classes consistently out-perform individualized classes, the sequence found in the basal readers may be one of the causes. On the other hand, if the two methods usually show no differences, then sequence may not be important.

Sartain (36) presented a 74 item bibliography on individualized reading and reviewed the literature. Most research studies, as Sartain points out, were of the action research types, and even these were limited in number. Most of the studies he reviewed concluded that the two approaches showed no significant differences in reading achievement. Some of the teachers were very enthusiastic about the individualized reading approach, and some stated that interest was higher with this approach. Evidence to support the conclusions often was lacking.

Though studies comparing basal reader and individualized reading approaches are sometimes contradictory, many of the studies show no difference in reading achievement. Does this mean that sequence is not important? Or could the individualized reading approach also have sequence - a sequence existing in the mind of the teacher? This latter is a question that cannot be answered at present.

LANGUAGE EXPERIENCE APPROACH VERSUS BASAL APPROACH

Investigations involving comparisons of language experience approaches have potential for throwing light upon the topic under investigation. As in most methods discussions, opinions are much more prevalent than reports of

research. What researchers label "language experience approach" varies considerably from study to study, but in all patterns there is considerably less emphasis placed on skill sequence in reading instruction than in programs using basal readers. If children in the language experience approaches equal or surpass children in the basal programs, then the belief that sequence is not important would be supported.

Six of the twenty-seven First Grade Studies used some type of language experience approach, and four are pertinent to sequence in skill instruction. A regular basal approach was compared with a language experience approach in the studies by Vilscek, Morgan, and Cleland (51), Hahn (15), Kendrick (21), and Stauffer (43). They were continued through a second year (52, 16, 23, 44). Summarizing all of the basal reader versus language experience comparisons in the First Grade Studies, Bond and Dykstra (4) pointed out that very few significant differences were found and that when they were found, they usually favored the language experience approach. They added that, in general, differences found were not of much practical significance. Dykstra (9), in summing up the second year studies, stated that the two groups were about the same in reading achievement.

IN SUMMARY

An attempt has been made to review a few selected recent studies and some opinions about sequence in reading skill instruction. The purpose of this presentation was to set the stage for a discussion of the issues. Most studies cited were not designed to reveal information on the topic under consideration. The major conclusion that can be drawn from this paper is that very few studies have really tackled the topic under discussion - "Sequence of Reading Skills in Reading: Is There Really One?"

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